C-DOT CES
(Compact Embedded System)

USER MANUAL

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DRAFT 02

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SERIES 000 : OVERVIEW

CSP SECTION NO. 423-027-0942

THIS C–DOT SYSTEM PRACTICE REFERS TO THE C–DOT COMPACT EMBEDDED SYSTEM

(ABBREVIATED AS C–DOT CES IN THE REST OF THIS PUBLICATION).

THE INFORMATION IN THIS SYSTEM PRACTICE IS FOR INFORMATION PURPOSES AND IS

SUBJECT TO CHANGE WITHOUT NOTICE.

A COMMENT FORM HAS BEEN INCLUDED AT THE END OF THIS PUBLICATION FOR

READER'S COMMENTS. IF THE FORM HAS BEEN USED, COMMENTS MAY BE ADDRESSED

TO THE DIRECTOR, (C&S) CENTRE FOR DEVELOPMENT OF TELEMATICS, C-DOT CAMPUS

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H:\CES\new_CES_USer manualRel1.5.doc   April 30, 2011

Chapter 1.

Introduction

1.1. GENERAL

Bharat Sanchar Nigam Limited (BSNL) is having countrywide presence with over 40 millions wire line & wireless telephone subscribers and offer hosts of other services like Data communication, National long distance, International Long Distance, Internet, Leased Line, etc. BSNL has proposed to implement next generation State-of-Art Call Detail Record (CDR) based Customer Care and Convergent Billing System. This can be achieved with deployment of Centralized Integrated Billing Systems with supporting technological and communication infrastructure.

To implement this, Call Detail Records (CDRs) are to be obtained from different type of Network elements capable of generating billable information, using centralized Mediation System.

This Feature will be implemented by setting up zonal billing centers and implementing all the software solutions along with the networking components meant for the SSAs.

In the BSNL Network, 50% of the lines are based on are of CDOT technology. CDOT supports the generation of 100% CDRs. These CDRs needs to be automatically transferred to the Billing center. This feature is being implemented by adding s/w application "FILE TRANSFER UTILITY" and introduction of new add on unit known as "Compact embedded systems" (CES) . CES has to be connected with both CDOT IOP's at every site.

CDRs for subscribers and trunk groups will be automatically transferred every hour from CDOT IOP to "Compact Embedded System" (CES), CES will be connected on LAN. All the CDRs can be picked up from CES at a predefined frequency by the billing center by using FTP application. This feature will be supported on s/w release 2219 and above.

File transfer utility comprises of hardware & software up gradations. All the billing files will be transferred on hourly basis to the attached Compact Embedded System (CES). The software module is developed on Linux Operating System Redhat 7.2 The module is functioning as collect and store system for the billing information which can be pulled by the billing centres over TCP/IP network.

1.2. ENVIRONMENT FOR THE FEATURE

The environment is the Billing subsystem of CDOT MAX, OS & Protocol services and Centralised CDR based billing system.

1.3. FEATURE AND ENVIRONMENT ASSOCIATION

1.3.1. Billing Subsystem of CDOT MAX

CDRs for subscribers & TGPs are generated at the end of every call and are dumped on IOP in the respective files. By default the subscriber CDRs are prepared & dumped for all Regional/STD/ISD calls. Subscriber needs to be put under LCL-BLG observation to generate the CDRs for Local calls also.

TGPs CDRs will be generated only if the TGP is under DET-BLG observation.

1.3.2. OS

The OS (Linux on CES and Unix on IOP) provides the necessary support for enabling reliable communication between IOP and CES and perform all the typical tasks.

1.3.3. Centralised CDR Based Billing System

Centralised CDR Based Billing System, has to collect the CDR files from CES using TELNET/FTP for actual processing, before files are removed from CES (only CDR files for last CDR_MAX_DAYS are kept at CES).

To implement CDR based billing, CDR files have to be available in such a system, from which TELNET/FTP is possible. But IOP doesn't support TCP/IP, so to transfer file from IOP, TELNET/ FTP is not possible. This new feature transfers CDR files from IOP to CES Box, which supports TELNET/FTP. After that, Centralised CDR Based Billing System can collect the CDR files from CES for billing purpose.
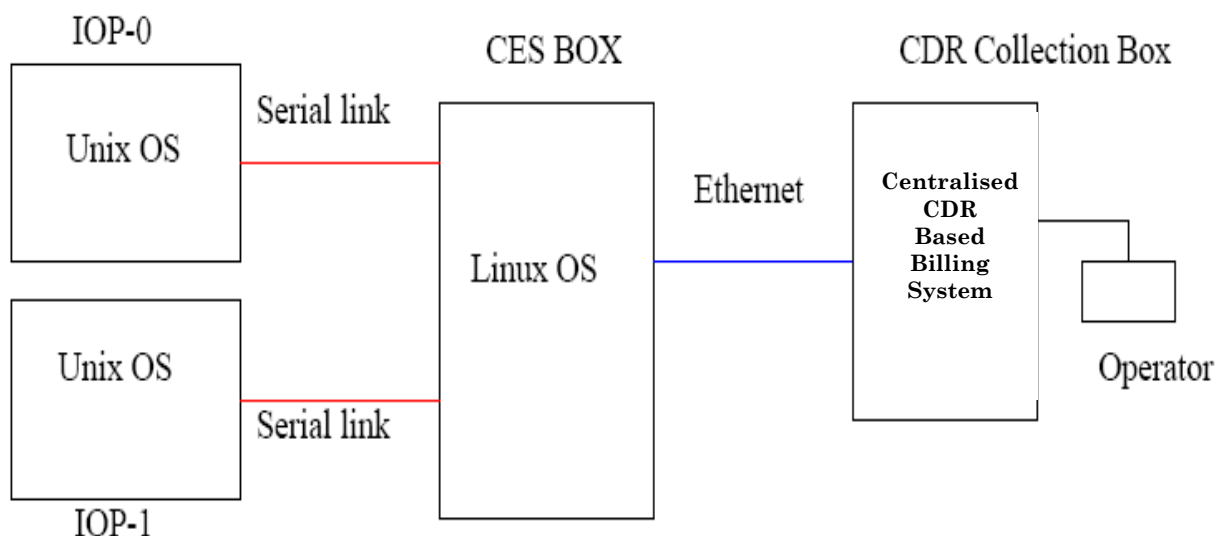
Figure 1. The pictorial representation of the Feature and Environment association

1.3.4. S/W Modifications

- In new S/W 2219 billing files are generated on hourly basis. For this purpose changes are required in existing IOP software. Corresponding changes have been made in Backup/Copy-out & Restore/Copy-in, displ-bill-rec, del-fgp-file commands in respective file groups.

- Changes in Sync Group

- File Transfer utility related new files

- Changes in RGEN UTILITIES to make it compatible with new S/W release 2219.

Chapter 2.

Hardware/Software Status & Relese Highlihts

2.1. HARDWARE STATUS

CES is Single Board Computer. This client has provision for connecting CRT monitor, Key Board, Mouse, LAN, Serial and USB ports. It operates on +48V power supply. Hardware is basically divided into two sections

1. **Computer Section :**

   Processor   : Thin client (SBC) with VIA processor, 1 GHz clock

   Permanent Storage Memory : 1 GB Compact ATA disk

   Synchronous DRAM : 256 MB DDR2 memory

   Display options : SVGA port for external monitor

   Input Interface : 1 x PS/2 Keyboard port for external keyboard

   USB Interface : 4 USB ports Ver. 2.0

   Serial Interface : 4 Serial ports (1 internal)

   Operating System : Support for Linux, Windows

   Ethernet Connectivity : 1 x 10/100 Mbps LAN port

2. **Power Supply Section:**

   Input Voltage   +48V DC

   Outputs Voltage   +5V DC

   Power Consumption   60W (approx)

2.2. ENVIRONMENTAL SPECIFICATION

Operating temperature range – 0°C to +40°C (32 to 104°F)

Maximum relative humidity – 5 % to 90%,non-condensing.

Storage temperature – 0°C to 70°C

2.3. SOFTWARE RELEASE   HIGHLIGHTS

2.3.1. Feature Highlights Rel 1.5 -

* A Fix has been provided to avoid IOP port hanging during CDR file transfer.
* Status check of both IOPs through CES using command "DISPL-IOP-STS"

  Exception: Whenever DISPL-IOP-STS utility will be invoked, it will show the IOPs status from

  iop_status log file in CES, upto the idle time after last file transfer, not the current IOP status.
* Provision to Install CES release1.5 from central location in the same network using FTP.
* Additon of new command to DISPLAY CES RELEASE at CES & IOP :
  New command "DISPL-CES-RELID" is added. This command will display CES release
  at CES as well as at IOP .
* In this release "UNINST-CES-FT" command can not be executed without stopping the
  file transfer utility as an error " Stop file transfer before De-installation" will be
  shown while giving this command
* Removal of old (older than CDR_MAX_DAYS)cdr files from CES that have been fetched by
  Mediation application & renamed with .old suffix.

2.4   SOFTWARE & HARDWARE STATUS

2.4.1. List Of Files in CES (release 1.5)

NOTE - THIS RELAESE IS SUPPLIED WITH TAR FILE ,EXTRACT THE FILES BY GIVING COMMAND TAR -XVF

```
[root@hpces ces1.5]# ls   -ls

total 2208

2204 -rw-r--r--    1 root     root      2252800 Apr 21 11:19 cesl1_1_1.5_1.tar

[root@hpces ces1.5]#tar   -xvf    ces1_1_1.5_1.tar

[root@hpces ces1.5]# ls   -ls

4 drwxrwxr-x    2 test     test       4096 Apr 20 15:33 ces_linux_exec

[root@hpces ces1.5]# cd   ces_linux_exec/

[root@hpces ces_linux_exec]# ls  -ls

total 2256

  4 -rwxrwxr-x    1 test     test        356 Apr 20 15:33 CES_AWK

  4 -rw-rw-r--    1 test     test        14 Apr 20 15:33 cesbox_relid
```

```
12 -rwxrwxr-x   1 test     test         9369 Apr 20 15:33 CES_CHK_UTIL
 8 -rwxrwxr-x   1 test     test         4802 Apr 20 15:33 CES_CKER_UTIL
 8 -rwxrwxr-x   1 test     test         4802 Apr 20 15:33 CES_DKER_UTIL
1984 -rwxrwxr-x   1 test     test      2027122 Apr 20 15:33 CES_KERMIT_PROT
132 -rwxrwxr-x   1 test     test       127794 Apr 20 15:33 CES_TX_UTIL
 4 -rwxrwxr-x   1 test     test         1922 Apr 20 15:33 CHK-PORT-UTIL
 4 -rwxrwxr-x   1 test     test          919 Apr 20 15:33 conn_readme.txt
 4 -rwxrwxr-x   1 test     test          512 Apr 20 15:33 DISPL-CES-PARAM
 4 -rwxrwxr-x   1 test     test         1028 Apr 20 15:33 DISPL-CES-RELID
 4 -rwxrwxr-x   1 test     test          271 Apr 20 15:33 DISPL-FT-LST
 4 -rwxrwxr-x   1 test     test          433 Apr 20 15:33 DISPL-FT-STS
 4 -rwxrwxr-x   1 test     test         1111 Apr 20 15:33 DISPL-IOP-STS
 8 -rwxrwxr-x   1 test     test         5368 Apr 20 15:33 GET_FT_DATE
 4 -rwxrwxr-x   1 test     test          335 Apr 20 15:33 INIT-CES-PARAM
16 -rwxrwxr-x   1 test     test        15827 Apr 20 15:33 INST-CES-FT
 4 -rwxrwxr-x   1 test     test         2093 Apr 20 15:33 INST-CES-PCH
 4 -rwxrwxr-x   1 test     test         1818 Apr 20 15:33 MOD-CES-PARAM
 8 -rwxrwxr-x   1 test     test         6689 Apr 20 15:33 MOD-CES-PWD
 4 -rwxrwxr-x   1 test     test          818 Apr 20 15:33 pathfile
 8 -rwxrwxr-x   1 test     test         7063 Apr 20 15:33 README_CES
 4 -rwxrwxr-x   1 test     test         2177 Apr 20 15:33 RMT_EXIT_UTIL
 4 -rwxrwxr-x   1 test     test          307 Apr 20 15:33 S99cdradmn
 4 -rwxrwxr-x   1 test     test         3852 Apr 20 15:33 START-FT-UTIL
 4 -rwxrwxr-x   1 test     test          440 Apr 20 15:33 STOP-FT-UTIL
 4 -rwxrwxr-x   1 test     test         3005 Apr 20 15:33 UNINST-CES-FT
```

2.4.2. List of files in IOP (Release 1.5)

Total 2813 blocks (ls –ls)

S.No.	File name	Block size	Byte size
1.	CIOP-LVL-UTIL	69	34739
2.	CIOP_STS_UTIL	75	37649
3.	INST-IOP-FT	15	7084

4.	INST-IOP-PCH	3	1502
5.	KERMIT-PROT	2414	1225227
6.	README_IOP	7	3572
7.	READ-SPD-UTIL	74	37012
8.	RUN-96-UTIL	1	77
9.	RUN-PROT-UTIL	1	75
10.	STOP_DATE_UTIL	1	160
11.	SPD_192__UTIL	74	37149
12.	SPD-96-UTIL	74	37148
13.	UNINST-IOP-FT	4	1983
14.	CESIOP_RELID	1	14

Chapter 3.

Installation Procedure

CES installation required to connect the CES box physically with IOPs and the installation of "File Transfer Utility" in both the IOPs. This utility has to be installed only on IOPs having release 2_2_1_9 onwards. Follow the procedure given below to install the CES properly. Please note that a PC Keyboard and Monitor (TFT or CRT) will need to be connected to the CES during installation. These can be disconnected later when the CES goes into operation.

3.1. PHYSICAL CONNECTIVITY BETWEEN IOPs & CES

CES can be connected in Two different modes with the IOP

Case: 1   When IOPs are in simplex refer Figure 2 for physical connectivity of IOP with CES. Serial port (ASIO) of IOP can be connected to COM1/COM2 of CES.

Case : 2   When IOPs are in Duplex refer Figure 3 for physical connectivity of IOPs with CES. The serial port of IOP0 can be connected to COM1 of CES and serial port of IOP1 can be connected to COM2 of CES. The connectivity can be made crossed if the password of both the IOPs are same.

However, it has been suggested to make the connectivity as shown in Figure 3 for the ease in rectification of the problem if one of the COM/ASIO port goes faulty.

Note :   *Any ASIO port (**except ASIO7**) of IOP can be used to make physical connectivity of IOPs with CES. The end to end connectivity of IOPs with CES can be checked by using CHK-PORT-UTILITY.*

System Architecture

IOP-5C   CES BOX

```
┌─────────────────────┐         ┌─────────────────────┐
│                     │         │                     │
│                     │         │                     │
│      ASIO-X         │─────────│      COM1/2         │
│                     │         │                     │
│                     │         │                     │
└─────────────────────┘         └─────────────────────┘
```

INS-ACT
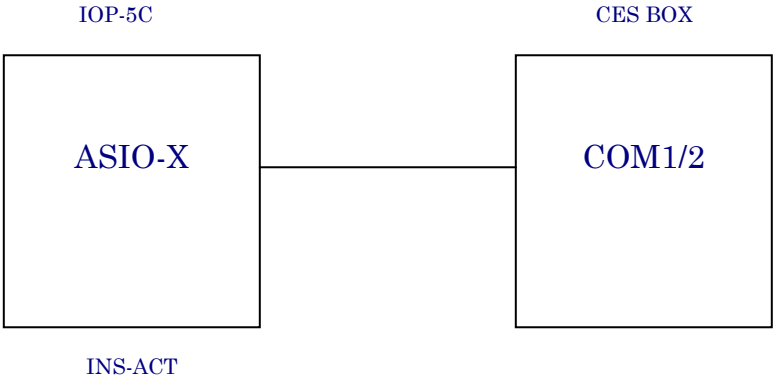
Fig. 2 IOP and CES Box Connectivity in Simplex Mode

IOP-5C

```
         ┌─────────────────┐              ┌─────────────────┐
         │                 │              │                 │
INS-ACT  │     ASIO-X      │──────────────│      COM1       │
         │                 │              │                 │
         └─────────────────┘              │                 │
                 ↕                        │                 │
              IOP-5D                      │                 │
         ┌─────────────────┐              │      COM2       │
         │                 │              │                 │
INS-SBY  │     ASIO-X      │──────────────│                 │
         │                 │              │                 │
         └─────────────────┘              └─────────────────┘
```

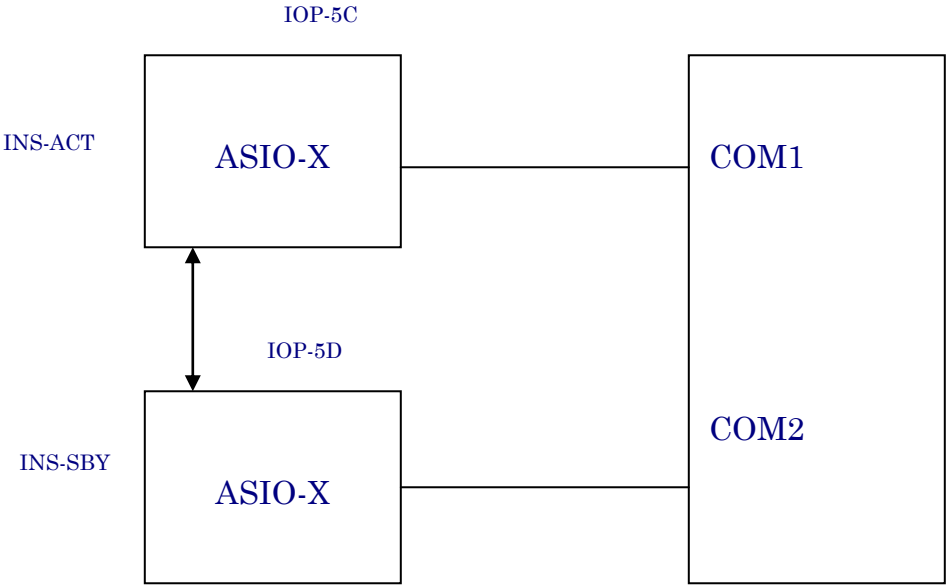**Fig. 3 Connectivity Between IOPs and CES Box in Duplex Mode**

The IOPs are physically connected to CES system through a cable with details given below. Two such type of cables are required to connect CES with both the IOPs.

Cable Details

A.   RS-232 cable having 9 pin female D-type connectors on both sides should be used.

B.   Pin connection for cable should be 2-3, 3-2, 5-5.

C.   Pin no 1-4-6 and 7-8 should be shorted both sides.

    1.   COM0 of CES to be connected to any ASIO port (having write permission for admn) of IOP-5C using serial link.

    2.   COM1 of CES to be connected to any ASIO port (having write permission for admn) of IOP-5D using serial link.
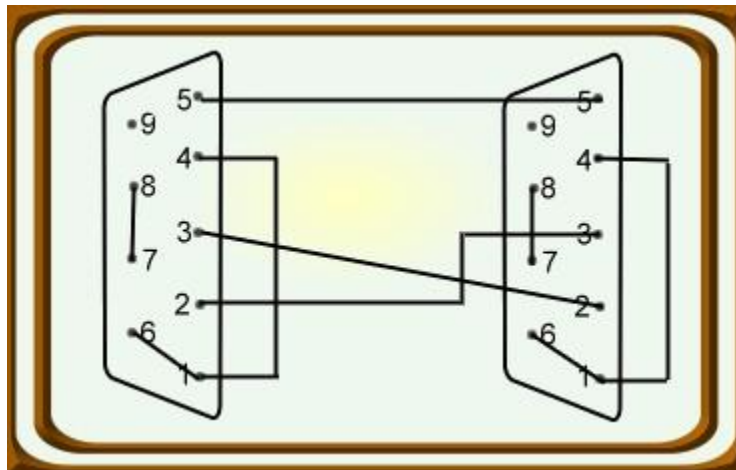
Figure: Above shows the connections between CES and IOP using RS-232D connecter

3.2.   POWER ON PROCEDURE OF CES

Switch on the CES system. It will boot automatically without user intervention wait for the "Localhost login" to appear on the screen.

Login into "cdradmn" account as given below

Localhost login: cdradmn

Password : cdradmn123

"[cdradmn@ces]$" prompt will appear on the screen

3.3.   INSTALLATION MODULE

The operator should invoke this module to install the necessary s/w for "CDR Based Billing" on CES & IOP .

3.3.1. Prerequisites

1) S/W Release on IOPs should be 2_2_1_9

2) IOPs should be in duplex mode

3) Detail billing shall be enabled for all the subscribers & Trunk groups so that ncbr/tgbr files formed should contain all billing records including local calls in the exchange. This can be done as follows

   i) Put all the subscribers under local billing observation using the following procedure.

   ♦ Run the utility alclbl.sh : (Refer chapter 6 point no 6.1.3 for detailed procedure).

   This utility is available in 2219 rgen utility.

ii) Put all the TGPs under detail-billing observation using the following CRP commands :

<ADD-TGP-BLG

[TGP-NO.] :

[TGP-NAME]   <DEFAULT>

This command is to be repeated for all the incoming, outgoing and Bothway Trunk groups for which detail billing is required.

3.3.2. Procedure for Installation of "CDR Transfer Utility Files" on IOPs in Duplex mode.(Fresh Insatallation)

The s/w files are to be copied on both the IOPs as per following steps.

Step 1 : Copy files from latest RGEN cartridge to IOP

1) In IOP-0 login into admn account. Insert " RGEN Utility" cartridge in IOP.

2) IOP5c>cd   / ↵

4) IOP5c> cpio   –icvdu <$TAPE ↵ wait till iop5c> prompt appears.

5) IOP5c> cd   /u/instalces

5) IOP5c> ls –ls   (to verify that all the related files have been copied)

6) Repeat the same steps 1 to 5 for **IOP-1** also.

Step : 2   Installing CES software on Duplex IOPs (assume IOP-0 is INS-ACT and IOP-1 INS-SBY.

1.   a.   Bring the SBY IOP (say IOP-1) into WARM-START level using CRP command   <INIT-IOP:2,1;

b.   login into root a/c as:

login   : root

passwd : DSSroot

 #>cd   /u/instalces

#>chmod   +x   INST-IOP-FT

#>./INST-IOP-FT

Wait until the following successful installation msg comes :

"Installation Complete".

cd   /

shutdown 0

Wait for INIT-SINGLE-USER-MODE

init 2

IOP will be initilized to warm start level. Login into admn account.

2. Bring the other IOP (i.e Active IOP-0) to warm start level by crp command

<INIT-IOP:2,1;

3. Repeat same steps 1(b) on IOP-0 also.

4. Bring IOP-0 as ins-act level using crp command

<INIT-IOP:5,1;

5. Bring IOPs in Duplex by using crp command on Active IOP (IOP-0)

< PUT-SWU-OOS:IOM,IOP-1;

< PUT-SWU-INS:IOM,IOP-1;

3.3.3. Procedure for Installation of CDR Transfer Utility Files in Simplex IOP (Fresh Installation)

Step 1 : Copy files from Latest RGEN cartridge to active IOP-0 (say)

1) In IOP-0 login into admn account. Insert " RGEN Utility" cartridge in IOP.

2) IOP5c>cd / ↵

4) IOP5c> cpio –icvdu <$TAPE ↵ wait till iop5c> prompt appears.

5) IOP5c> cd /u/instalces

5) IOP5c> ls –ls (to verify that all the related files have been copied)

Step : 2 Installing CES software on Simplex IOP (assume IOP-0 is INS-ACT).

1. a. Bring the ACT IOP-0 into WARM-START level using CRP command <INIT-IOP:2,1;

b. login into root a/c as:

login : root

passwd : DSSroot

#>cd /u/instalces

#>chmod   +x   INST-IOP-FT

#>./INST-IOP-FT

Wait until the following successful installation msg comes :

"Installation Complete".

cd   /

shutdown 0

Wait for INIT-SINGLE-USER-MODE

init 2

IOP will be initilized to   warm start level. Login into admn account.

4.   Bring IOP-0 as ins-act level using crp command

<INIT-IOP:5,1;

3.3.4.   Procedure for Re-Installation of "CDR Transfer Utility Files" on IOPs in Duplex mode(IOPs having Old release files)

3.3.4.1.   De-installation of "CDR Transfer Utility" in IOP (assume IOP-0 is INS-ACT and IOP-1 INS-SBY)

1. a. Bring the IOP-1 into WARM-START level using CRP command

<INIT-IOP:2,1;

b. login into root account

#>cd   /u/instalces

#>chmod   +x   UNINST-IOP-FT

#>./UNINST-IOP-FT

`Wait until the following successful un-installation msg comes :

`**"Uninstallation Complete"**

` "Removing the utility $AUDITP/UNINST-IOP-FT..........."

#Press CTRL-D & login into admn account

c) In IOP-1 login into admn account. Insert " RGEN Utility" cartridge in IOP.

i)   IOP5d>cd   /u

ii)   IOP5d> rm   -r instalces

iii)   IOP5d>cd   /

iv)   IOP5d> cpio   –icvdu <$TAPE ↵

wait till iop5c> prompt appears.

v)   IOP5c> cd   /u/instalces

IOP5c> ls –ls   (to verify that all the related files have been copied)

2. a. Bring the IOP-0 (i.e. INS-ACT IOP) into WARM-START level using CRP command

b. <INIT-IOP:2,1;

c. Repeat the same step 1 a),b) & c) on IOP-0 also.

3.3.4.2. Installation of "CDR Transfer Utility" in IOP-0 & IOP-1 (both in Warm-Start   level)

Step 1 : Installing File Transfer Utility on IOP-0 (Prev. Active)

1. Do following in IOP-0

login into root a/c as:

login   : root

passwd : DSSroot

 #>cd   /u/instalces

#>chmod   +x   INST-IOP-FT

#>./INST-IOP-FT

Wait until the following successful installation msg comes :

"Installation Complete".

cd   /

shutdown 0

 Wait for INIT-SINGLE-USER-MODE

 # init 2

IOP will be initilized to   warm start level.

Login into admn account.

3.   Bring IOP-0 as ins-act level using crp command <INIT-IOP:5,1;

Step 2 : Installing File Transfer Utility on IOP-1

1.   Repeat same steps 1 (a) for installing the FT   utility on

IOP-1   also.

Then synchronize IOP-1 from IOP-0.

3.4. INSTALLATION OF CES S/W AT CES SYSTEM

3.4.1. Fresh Installation at CES

1.   After power on the CES system , the login appears on the monitor.

2. **login** as root

    Password: root123

    "[root@ces cesinstall] #>" prompt will appear on the screen

3. Make a directory **/root/ces1.5**

    [root@hpces root]#**mkdr**   **/root/ces1.5**

4. Copy the   CES S/W Rel 1.5   files in /root/ces1.5   through **ftp** or using any **USB device.**

    For copying from USB device do following:

    Insert the USB drive in CES USB slot.

    [root@hpces root]# **mount**   **/dev/sda1**   **/mnt**

    [root@hpces root]# **cd**   **/mnt**

    [root@hpces root mnt]# **cp**   **/mnt/cesl1_1_1.5_1.tar**   **/root**

    [root@hpces root mnt]#**cd**

    [root@hpces root]#**umount**   **/mnt**

    Remove the USB drive.

    [root@hpces root]# **tar   -xvf   cesl1_1_1.5_1.tar**

    A new   directory 'ces_linux_exec' will be generated.

    [root@hpces root]#**cp   /root/ces_linux_exec/*   /root/ces1.5**

    [root@hpces root]#**cd   ces1.5**

    After copying the files ,verify by ls -ls command that all the relevant files are available in the   ces1.5 directory.

    [root@hpces root ces1.5]#**ls   -ls**

5. Now **Install the new S/W Rel1.5** by following command:

    [root@hpces root   ces1.5]# **./INST-CES-FT**

    It will show many messages on the screen & at the end

    " Installation Complete" message will appear.

6. Shutdown CES by following command:

    [root@hpces root]# **cd   /**

    [root@hpces root]# **init   0**

    wait for the message "Halting system followed by powerdown" to

    appear on the screen. Then CES will be powered-off.

7. Power-on the CES equipment.

    login as **cdradmn** by giving the command :

ces login : cdradmn

Password: cdradmn123

"[cdradmn@ces]$" prompt will appear on the screen

8. Store the password for admn user of IOP-5C & IOP-5D in CES, by running the utility MOD-CES-PWD as following:

[cdradmn@ces]$ **MOD-CES-PWD**

Enter IOP id [5c/5C/5d/5D] : " Give 5c or 5C for IOP-0"

Enter Password for above specified IOP (8 character max.) : "e.g. CDOTadmn"

[cdradmn@ces]$ MOD-CES-PWD

Enter IOP id [5c/5C/5d/5D] : " Give 5d or 5D for IOP-1"

E**nter Password for above specified IOP (8 character max.)** : "e.g. CDOTadmn" this completes the installation of file transfer utilities on IOP and CES system

8. Now to start file transfer utility automatically, the first file has to be transferred manually by giving command as under

 [cdradmn@ces]$START-FT-UTIL -m

After execution of this command it will ask for required inputs like from date, to date , to Date and to time

Wait for sometime till the manual transfer of files is not over.

Note :During manual transfer of files any other command cannot be executed.

9   To start file transfer utility automatically execute the following command

[cdradmn@ces]$START-FT-UTIL -a

Note :This command runs in background so during automatic mode of transfer of files the command prompt appears on the screen and all other commands can be executed parallely.

3.4.2. RE-INSTALLATION AT CES SYSTEM OVER THE EXISTING RELEASE

The procedure for installing the new release1.5 is same as given above but Uninstall the currently running release with the new UNINST-CES-FT command from root path..

1. **login** as root

Password: root123

 "[root@ces cesinstall] #>" prompt will appear on the screen

2. Make a directory   /root/ces1.5

 [root@hpces root]**#mkdir   /root/ces1.5**

Save the old cdr files (if required) in bkp directory as shown below:

[root@hpces root]#**mkdir   /root/bkp**

[root@hpces root]#**cd   bkp**

[root@hpces root]#cp   /home/cdradmn/cdr/blg/nc*.dat   /root/bkp

[root@hpces root]#cp   /home/cdradmn/cdr/blg/tg*.dat   /root/bkp

4. Copy the   CES S/W Rel 1.5   files in /root/ces1.5   through **ftp** or using any **USB device.**

For copying from USB device do following:

Insert the USB drive in CES USB slot.

[root@hpces root]# **mount   /dev/sda1   /mnt**

[root@hpces root]# **cd   /mnt**

[root@hpces root mnt]# **cp   /mnt/cesl1_1_1.5_1.tar   /root**

[root@hpces root mnt]#**cd**

[root@hpces root]#**umount   /mnt**

Remove the USB drive.

[root@hpces root]# **tar   -xvf   cesl1_1_1.5_1.tar**

A new   directory 'ces_linux_exec' will be generated.

[root@hpces root]#**cp   /root/ces_linux_exec/*   /root/ces1.5**

[root@hpces root]#**cd   ces1.5**

After copying the files ,verify by ls -ls command that all the relevant files are available in the   ces1.5 directory.

[root@hpces root ces1.5]#ls   -ls

5. Stop File Transfer Utilty (FT UTIL) :

Login into cdradmn/ cdradmn123.

[cdradmn@ces]$ cd   cdr

[cdradmn@ces cdr]$ cd   exec

[cdradmn@ces cdr exec]$ STOP-FT-UTIL

This will show messages regarding gracefull exit from

File Transfer

7. Now **Un-install** the old S/W Rel1.2(or existing) by following command:

Login into   root by root/root123

[root@hpces root]# **cd   /root/ces1.5**

[root@hpces root]#**chmod +x   UNINST-CES-FT**

[root@hpces root ces1.5]# **./UNINST-CES-FT**

Do you want to uninstall ? (Y/N) Press **Yes**

Wait for message " Un-installation Complete"

Some messages regarding stopping of various protocols will be shown. Watch for the following messages:

Removing the /home/cdradmn/cdr

Removing the utility /usr/bin/CES_KERMIT

Removing the utility /usr/bin/INST-CES-PCH

Users & Grps will not be deleted.

Removing the other files ....

" Uninstallation Complete"

Removing the utility /usr/bin/UNINST-CES-FT

At the end root prompt appears again.

[root@hpces root]#

Note: If above messages do not appear, wait for 5 minutes & give enter.Root prompt will appear.Give ./UNINST-CES-FT   again. Now the Un-Installation should be completed with proper messages.

8.   Then **Install the new S/W Rel1.5** by following command:

[root@hpces root]# **cd   /ces1.5**

[root@hpces root ces1.5]#**chmod   +x   INST-CES-FT**

[root@hpces root ces1.5]#**./INST-CES-FT**

9.   Shutdown CES by following command:

[root@hpces root]# **cd   /**

[root@hpces root]# **init   0**

wait for the message "**Halting system followed by powerdown**" to

appear on the screen. Then CES will be powered-off.

10.   Power-on   CES   Equipment.

login as cdradmn by giving the command :

ces login : cdradmn

Password: cdradmn123

"[cdradmn@ces]$" prompt will appear on the screen

11.   Store the password for admn user of IOP-5C & IOP-5D in CES, by

running the utility MOD-CES-PWD as following:

[cdradmn@ces]$ **MOD-CES-PWD**

Enter IOP id [5c/5C/5d/5D] : " Give 5c or 5C for IOP-0"

Enter Password for above specified IOP (8 character max.) : "e.g. CDOTadmn"

[cdradmn@ces]$ MOD-CES-PWD

Enter IOP id [5c/5C/5d/5D] : " Give 5d or 5D for IOP-1"

Enter Password for above specified IOP (8 character max.) : "e.g. CDOTadmn" this completes the installation of file transfer utilities on IOP and CES system

12. **Restoration of old backup of cdr files stored in /root/bkp**

[cdradmn@ces]$**cd   cdr**

[cdradmn@ces   cdr]$**cd   blg**

[cdradmn@ces cdr blg]$**ftp   <self IP address of CES *>**

 Name (cdradmn) : **root**

Pwd: root123

ftp**# cd   /bkp**   (it will show directory bkp changed successfully)

ftp**#prompt**   (it will exit from interactive mode)

ftp**#mget   ***   (it will show all the files transferred from /root/bkp to

                    current directory)

ftp**#bye**

[cdradmn@ces cdr blg]$ ls -ls   (should show the restored nc* & tg*)

* Self IP address can be taken by command 'ifconfig' given in root account.

13. Now to start file transfer utility automatically, the first file has to be transferred manually by giving command as under

 [cdradmn@ces]$START-FT-UTIL -m

After execution of this command it will ask for required inputs like from date, to date , to Date and to time

Wait for sometime till the manual transfer of files is not over.

Note :During manual transfer of files any other command cannot be executed.

14. To start file transfer utility automatically execute the following command

[cdradmn@ces]$START-FT-UTIL -a

Note :This command runs in background so during automatic mode of transfer of files the command prompt appears on the screen and all other commands can be executed parallely.

## 3.4.   PROCEDURE FOR CONNECTING THE CES WITH NETWORK

The CES is required to be connected to the TCP/IP network so that the billing files can be transferred from the CES to the Centralized Integrated Billing Systems. This require the static IP address and other network parameters like Netmask, Default Gateway etc. to be configured in the CES system. The IP address and other network parameters will be issued by competent authority. After receiving the same proceed as per the procedure given below.

1.   **Login** as cdradmn

       Password cdradmn123

2.   **[cdradmn@ces]$ netconfig**

       Following screen appears :
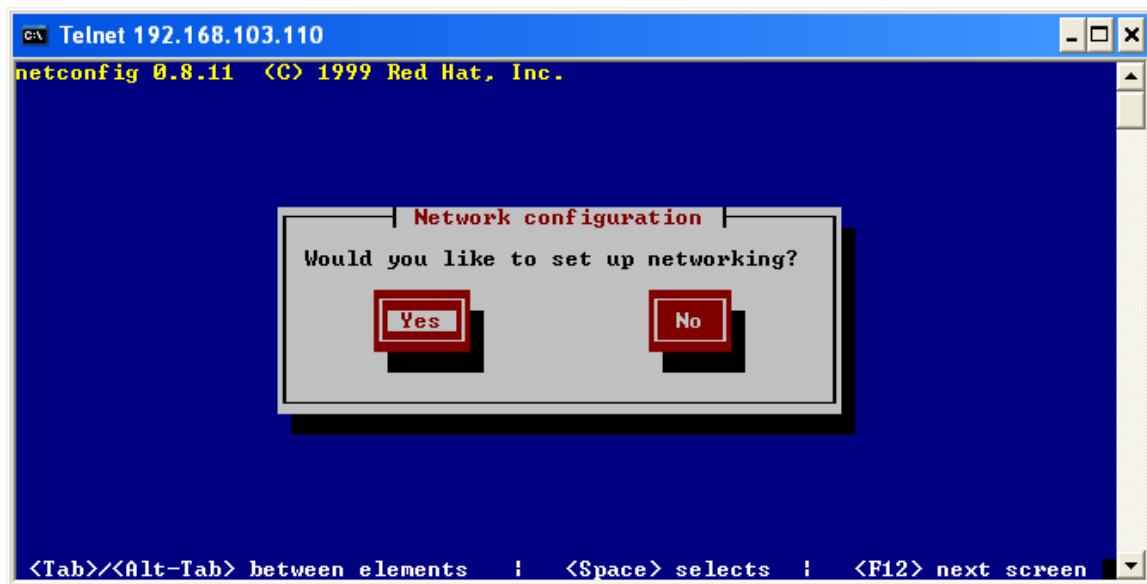
3.   Click on Yes

       Following screen appears
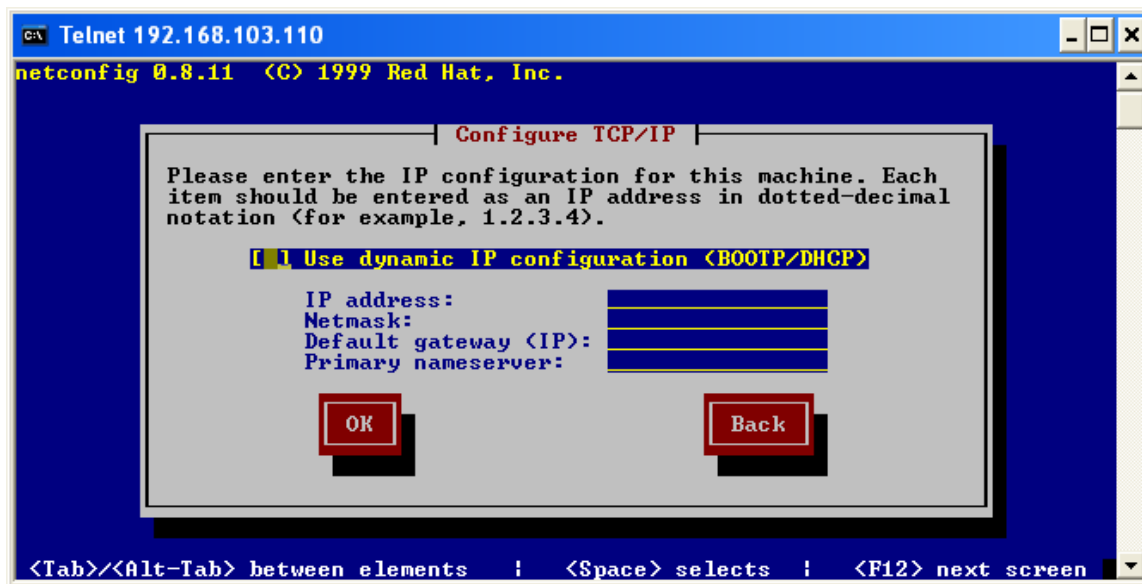
4. Ensure that IP configuration (BOOTP/DHCP) is unchecked. (The status can be changed by pressing space bar key).

5. Type rest of the details as given by competent authority

   (Primary nameserver can be blank in our case, this is not a mandatory field).

6. Then select OK and press ENTER Key

7. This will come to **[cdradmn@ces]$** prompt.

   Press ctrl + alt + delete to reboot the machine.

   Now the IP address is changed as per the requirement.

   Note: You can use arrow keys or "tab" key to move the cursor to next field.

3.5. PROCEDURE FOR DE-INSTALLATION AT CES SYSTEM

Note: *The administrator should modify the password of CES root A/c after installing the CES to avoid unauthorized use.*

1. Login into root account

   [root@ces cesinstall] #>chmod +x UNINST-CES-FT

   [root@ces cesinstall] #> **.**/ UNINST-CES-FT Do you want to uninstall ? (Y/N)

   Press Y for uninstallation of "CDR Transfer Utility" on CES

3.6. SHUTDOWN PROCEDURE OF CES

Login into root account

Login : root

Password : root123

The hash (#) prompt will appear on the screen

Now give command as given below

#> cd /

#> init 0

wait for the message "Halting system followed by powerdown" to appear on the screen

Chapter 4.

Overview of the Utility Commands & Applications Software Commands

4.1. OVERVIEW OF THE UTILITY

CDR-UTIL is a group of utilities, which are responsible for transferring CDR files from IOP to CES Box for implementing CDR Based Billing system in the network.

`CDR-UTIL' consists of the following sub-modules :

1.   Installation Module

2   Initialization Module

3.   File Transfer Module at SEI (SEI_UTIL)

4.   File Transfer Module at IOP (IOP_UTIL)

5.   Environment Variable Setting Module at SEI (SET_ENV_VARS)

6.   Kermit Protocol Module

7.   Password updation Module

4.2. FUNCTIONALITY OF MODULES

Major functionality of the different sub-modules are as follows :

- **Installation Module** - This module has to be invoked by the operator to install the necessary s/w for "CDR Based Billing Feature" on CES Box and IOP.

  This block generates hour wise CDR files on IOP. The CDR files will be as following :

  nchhddmmyy.dat (for NCBR) and tghhddmmyy.dat (for TGCBR) . Where hh represents hour, dd represents day, mm represents month and yy represents year.

- **Initialization Module** - This module is invoked automatically after booting of the CES Box to start periodic CDR file transfer from IOP to CES Box.

- **File Transfer Module at SEI** (SEI_UTIL) - This module is invoked for transferring CDR files automatically or manually from IOP to CES Box.

Automatic File Transfer Block

This block starts CDR file transfer activities in CES when CES comes up after booting. It can be invoked by giving command after installation of the feature or whenever initiation for automatic transfer is needed. After feature installation and

invocation, it continuously requests for the pending CDR files to transfer from the inservice IOP. In case of no CDR file is pending to be transferred from inservice IOP to CES, it waits till the next hour boundary to initiate CDR file transfer again.

Manual File Transfer Block

This block starts file transfer activities in CES when operator requests to transfer some specific CDR files.

- **File Transfer Module at IOP** (IOP_UTIL) - This module is invoked during automatic or manual file transfer for checking the IOP level and to get the current date & time of IOP. This block checks the IOPs level, whether it is in INS_LEVEL or not. If the IOP is in INS_LEVEL, then for automatic file transfer, it sends the current date of IOP to CES. This block is activated by the file transfer utility at CES before any file transfer.

- **Environment Variable Setting Module at SEI** (SET_ENV_VARS) - This module is invoked by the operator to set the environment variables at CES, when START-FT is not running.

- **Kermit Protocol Module** - Kermit protocol supports the various serial port communication settings & files transfer between IOP to CES.

- **Password Updation Module** - This module is invoked by the operator to change the password stored in CES for login on IOP.

4.3. FEATURE ENTITIES

The entities involved in the feature are :

1. BISP
2. MMI on IOP
3. KERMIT
4. FT_INSTAL
5. CES_TX_UTIL
6. IOP_UTIL
7. INIT-CES-PARAM

4.3.1. Entity Description:-

BISP

This process resides at IOP and takes care of creation of all the billing files and dumping of different types of billing records to corresponding billing files. All the CDRs (NCBR/TGCBR) are generated on the per call basis and are dumped to corresponding files at IOP when sufficient number of records are already generated. At present, day wise CDR files are created on the IOP, i.e., made on the starting of the day boundary and closed on the next day boundary. CDR for all calls completed in between time, are dumped on the related file before it is closed. So if we transfer a present day CDR file, then

its size also can change during the transfer of the file, which may lead to corrupted CDR file at CES. To avoid the file corruption, we should transfer closed CDR file. But, if we transfer past day CDR files, then current day record can't be viewed on-line. So, to minimise the time lag in on-line CDR based billing, CDR files (NCBR/TGCBR) are split on the hourly basis.

MMI On IOP

MMI support on IOP is required to dump CDR for all calls. Presently if any call is Regional/STD/ISD or if the subscriber/tgp have detail billing facility, then CDR of the call is stored in the file. Details of the MMI support required for dumping all CDRs in files will be described later.

Also to support hour wise generated CDR files, CEP of DISPL-BILL-REC command has been changed. Previously this command used to display the billing records from the day wise generated CDR files. Now after hour wise CDR file generation, it will show the billing records from the hourly generated CDR files.

KERMIT

Kermit protocol has been used to transfer file from IOP to CES.

Kermit is an extensible file transfer protocol first developed at Columbia University in New York City in 1981 for transferring text and binary files without errors between diverse types of computers over potentially hostile communication links.

FT_INSTAL

FT_INSTAL is the CDR based billing feature installation program, it has two parts, one at CES and other at IOP, as following :

1>INST-CES-FT

2>INST-IOP-FT

INST-CES-FT

INST-CES-FT is the installation program, which has to run on CES during "CDR Based Billing feature" installation on any site. This program creates all the required directory structure on CES and install all the required application on CES.

INST-IOP-FT

INST-IOP-FT is the installation program, which has to run on IOP during "CDR Based Billing feature" installation on any site.This program creates all the required directory structure on IOP and install all the required application on IOP.

CES_TX_UTIL

It starts running whenever automatic or manual CDR file transfer is invoked. It is required to invoke this utility with some specific arguments to

start particular type (automatic/manual) of transfer. This utility invokes IOP_UTILb(on IOP) to get the levels of IOPs. Before every file transfer, IOPs level have to be checked. File are transferred from INS_LEVEL IOP only. After deciding from which IOP file have to be transferred, in automatic file transfer CES_TX_UTIL gets the current date of the IOP.

Depending on current date of IOP and last transferred file available at CES, it decides which files have to be transferred in case of automatic transfer. In automatic transfer, after transferring all the pending files upto the current complete file in IOP, CES_TX_UTIL will run a timer to invoke itself on the next periodicity. CES_TX_UTIL stores the transferred CDR files in /home/cdradmn/cdr/blg directory.

IOP_UTIL

It is invoked by CES_TX_UTIL during every file transfer. It checks the IOPs current run level and returns it to CES, if it is not INS_LEVEL, then all other levels are improper for file transfer. If it is in INS_LEVEL, then it also reads the current date of IOP and sends it to CES.

INIT-CES-PARAM

This utility will be invoked by the operator to change the value of any environment variables at CES. When any file transfer is going on, this utility can't be invoked. This can be invoked after installation or after stopping the running CDR tx application (using STOP-FT-UTIL).

4.3.2. Commands in CES

S. NO	COMMAND MNEMONICS	Purpose of the Command
1	MOD-CES-PWD	Change the password stored in file on CES for login to IOP
2	DISPL-FT-STS	Display the status of file transfer
3	DISPL-FT-LST	Display the list of transferred CDR files
4	INST-CES-FT	Install CDR File Transfer utility on CES
6	MOD-CES-PARAM	Modify environment variables
7	START-FT-UTIL	Start file transfer in auto or manual transfer mode
8	UNINST-CES-FT	Uninstall "file transfer utility" on CES
9	CHK-PORT-UTIL	To check connectivity between CES & IOPs
10	DISPL-CES-RELID	To check the software release of CES and IOP
11	DISPL-IOP-STS	To check the status of both IOPs from CES

4.3.3. IOP Commands

S. NO	NEW COMMAND MNEMONICS	Purpose of the command
1.	INST-IOP-FT	Creates the necessary directories & copy all applications at IOP for CDR based billing feature
2.	UNINST-IOP-FT	Remove the directories & all applications from IOP created for CDR based billing feature

Chapter 5.

Backup Procedure

5.1. BACKUP PROCEDURE AT CES

Note :   The administrator should modify the password of CES root A/c after installing the CES to avoid unauthorized use.

The backup of billing files can be taken from CES through the USB port provided with the system. The stepwise procedure is as under

step1 : login in root account as under

> **ces login**: root
>
> **Password:** root123
>
> **"[root@ces root]#"** prompt will appear on the screen

step2 : Go to directory /home/cdradmn/cdr/blg "where cdr files are available"

> **[root@ces root]#** cd   /home/cdradmn/cdr/blg

step3 : Insert the memory device in USB port

> **[root@ces root]#** mount   /dev/sda1   /mnt
>
> this command will mount your memory

step4: Make a directory (e.g cdrbackup) on memeory device

> **[root@ces root]#** mkdir   /mnt/cdrbackup

step5 : copy all cdr files from CES to memory device

> **[root@ces root]#** cp   *.dat   /mnt/cdrbackup

step6 : Check wheather all files are copied or not on the memory device

> **[root@ces root]#** cd   /mnt/cdrbackup
>
> **[root@ces cdrbackup]#** ls

step7: unmount the memory device and jackout from USB port

> **[root@ces cdrbackup]#** cd   /
>
> [**root@ces root]#** umount   /mnt

5.2. RESTORATION PROCEDURE

Stepwise procedure for restoration of cdr files from memory device to CES system:

step1:   login in root account as under

> **ces login**: root

Password: root123

"[root@ces root]#" prompt will appear on the screen

step2 :   Go to directory /home/cdradmn/cdr/blg where cdr files are available

[root@ces root]# cd   /home/cdradmn/cdr/blg

step3 :Insert the memory device in USB port and mount it by giving following command

[root@ces root]# mount   /dev/sda1 /mnt

step4 **:**Copy all cdr files from the directory backupcdr present in memory device to the existing   directory in CES system

[root@ces root]# cp   /mnt/backupcdr/*.dat   .

step5: Check weather files are copied or not on ces system

[root@ces root]# ls

step6: unmount the memory device by giving folllowing command

[root@ces root]# umount   /mnt

jackout memory device from USB port

Chapter 6.

Maintenance Procedure

6.1. ADDITIONAL UTILITIES

In addition with the CES feature related utilities , there are few   utilities which are provided to assist the maintenance person for the misc. requirements as under

6.1.1. Check port utility [CHK-PORT-UTIL]

This utility will be supplied with CES system

This utility is used to check the link between IOP and CES. Before the execution of this utility, first stop the CDR Transfer Utility. This utility is interactive and ask operator for com port as input. All successful or error messages will come on console (no log file is generated for this utility). After checking for a single com port it will ask operator input if check for another com port is needed.

To run this utility Login into root account

[root@ces root]# cd /root/connect

[root@ces root]#   **.** /CHK-PORT-UTIL

wait till the status of link between CES and IOP for the corresponding port appear on the screen

To exit from this utility operator has to enter 0.

6.1.2. cdr_util -

This utility is used at IOP side to merge hourly maintained tghhddmmyy and nchhddmmyy files in $DUMPP directory into daywise tgbrddmmyy and ncbrddmmyy files respectively. This utility is used at IOP5X> prompt in the following format -

cdr_util [-o tg/nc] -f <from date (ddmmyy)> -t <to date (ddmmyy)>

6.1.3. alclbil.sh util

This utility is used at IOP side for changing detail billing of all subscribers created in the system from ord-blg to lcl-blg and vice versa. This utility is used as per the procedure given below

(This utility is available on C-DOT helpline site and can be downloaded form there. It is also available in 2219 rgen utility).

Copy this utility into /u/admn/rgen

♦ **Enable Detail Billing :** Put all the subscriber under LCL-BLG.

Give following command

IOP5X>chmod   755   alclbil*

IOP5X>alclbil.sh   0

This command will convert the detail bill option of all subscribers from ord-blg to lcl-blg.

Repeat the above step on the other IOP also.

Give **PART INIT** to the system from active IOP.

♦ **DISABLE DETAIL BILLING:** To revert back the changes i.e converting detail bill option from LCL-BLG to ORD-SUB, give command

IOP5X>alclbil.sh   1

Give **PART INIT** to the system after running this utility on both the IOPs .

This command will convert the detail bill option of all subscribers from LCL-BLG to ORD-BLG.

6.2.   ERROR RECOVERY PROCEDURES

6.2.1.   Error Cases Covered

6.2.1.1.   *CES goes down for long time*

When CES comes up after long time, after successful login to any INS_LEVEL IOP,

START-FT gets the current date of that IOP. If there is no CDR file present in CES which has been made within CDR_MAX_DAYS, then request will be generated to transfer all CDR files which have been made in last CDR_MAX_DAYS upto the current complete CDR files in IOP.

6.2.1.2.   *IOP/LINK goes down during file transfer*

If any IOP or link goes down during file transfer, then CES tries to transfer file from other IOP (if other IOP is in INS_LEVEL and other link is up). If last transferred file available on CES is not successfully transferred, then it will be transferred again.

6.2.1.3.   *Both IOPs/Both links go down (in Duplex Mode)*

If both links/both IOPs go down, then CES tries to login on both IOP alternately. After every CDR_MAX_RETRIES for login to INS_LEVEL IOP, alarm/error msg will be generated and pause for sometime. This login process continues until any link comes up and IOP connected with that link becomes INS_LEVEL, after that, it starts normal file transfer.

6.2.1.4. *File doesn't exist on IOP*

If any requested file doesn't exist on IOP, then it is assumed that file is not created by BISP and no re-trial will be made for that file, CES tries to transfer next pending file. No error report will be generated for that non-existing file.

6.2.1.5. *Incomplete File re-transfer*

During any file transfer, if any problem comes (as link goes down or operator initiates manual file transfer when periodic file transfer going on) and file transfer activity is stopped, then the last transferred file may be incomplete. To recover the incomplete file, it is re-transferred to CES during next automatic transfer session.

6.2.1.6. *Password changes in IOP for "admn" login a/c*

CES software contains the password for the admn a/c of IOP, that can be modified by the operator through specific command at CES, in case of password change at IOP.

6.4. PROCEDURE FOR VERIFYING CDR FILES, FT STATUS, IOP STATUS LOG

6.4.1. File Transfer (FT) Status :

login as cdradmn by giving the command :

ces login : cdradmn

Password: cdradmn123

[cdradmn@ces]$cd   cdr

[cdradmn@ces cdr]$cd   exec

[cdradmn@ces exec]$DISPL-FT-STS

 This will show the nc* & tg* files   under transfer.

Or message File Transfer not running etc will be shown.

6.4.2. To Displ all the existing CDR files :

[cdradmn@ces]$cd   cdr

[cdradmn@ces cdr]$cd   blg

[cdradmn@ces blg]$ls   -ls

This will show all the existing CDR files (nc* & tg*)

6.4.2. To Displ   IOP status log file :

[cdradmn@ces]$cd   cdr

[cdradmn@ces cdr]$cd   log

[cdradmn@ces log]$ls   -ls

This will show all the existing   log files, including iop_status_log file.This file can be opened by cat or pg command to see the IOP status at different Hrs.

IOP status can also be checked by following command:

[cdradmn@ces]$cd   cdr

[cdradmn@ces cdr]$cd   exec

[cdradmn@ces exec]$DISPL-IOP-STS

This will show   Status of both the IOPs at different Hrs.

Chapter 7.

Dos & Don'ts

7.1. Dos

1. *Only "cdradmn" user is valid for invoking any command for file transfer utility. Before giving any commands proper connectivity check and installation have to be done on IOPs and CES.

2. In automatic transfer, files will be transfer for last **CDR_MAX_DAYS** which includes current day also. Presently its value is 2, which can be changed by environment variable setting utility **SSEI_SET_ENV** by execution of command MOD-CES-PARAM.

3. At any time only one file transfer utility can run i.e. either automatic or manual. So for manual mode of transfer of files , first automatic transfer of files has to be stopped .After manual file transfer is over, operator have to re-start. If manual file transfer is running then no new file transfer can be started until the previous one is over.

4. File will be transferred from INSERVICE LEVEL IOP only. Other commands can be run during automatic mode of file transfer by pressing ctrl c

5. **Before connecting the ASIO port with CES, the same port has to be connected with any terminal and login as admn in that terminal, so that "getty" comes for that icc port.** After this remove the terminal, and connect as described (in fig 2 & 3) or port has to be enabled if disabled.

6. Always run the cdr_util at the 00:00 hrs.

7.2. Don'ts

1- The CES system works on -48V power supply. So please ensure the power cable connections with the multimeter before connecting it to CES system

2.- Don,t Jack out or Jack in the IOP to CES cable connecter from the COM ports of CES in power on condition .

3.- Shutown the CES system before changing the COM port by executing command init 2/shutdown 0.

4.- Do not cross connect the cables between IOP and CES if the password of two iops are different.

5.- Do not abruptly interrupts any running application by pressing ctrl c or ctrl d.

6- Any other command cannot be run during manual mode of file transfer

7- Online patching of ces is not possible.

8- INS_LEVEL of IOP will be checked only before the starting of a file transfer. Once file transfer starts, it will continue, even if IOP level changes from INS_LEVEL to any other level.

9- Once any CDR file is transferred successfully to CES, it will not be re-transferred automatically. So, if IOP time is changed to any previous hour using SET-SYS-TIM command, then re-opened CDR files in IOP will not be re-transferred which are already exist in CES.

Appendix - A

Definitions and Acronyms

A.1 DEFINITIONS

- Module: It is a passive entity, which provides some desired functionalities. It encapsulates the internal details, not required to be known by other objects, and provides a clear external interface for invoking them.

- CDR: Call Detail Record is the detailed information of a particular call in the exchange. It is stored in a hour specific file after the call completion. Depending on the call type this can be NCBR/TGCBR.

- CDR Files: These files are generated hourly. NCBRs are stored in nchhddmmyy.dat, TGCBRs are in tghhddmmyy.dat and INBRs are in inhhddmmyy.dat, where hh represents hours, dd - day, mm - month and yy - year.

- Operator - One who can login into CES i.e., billing centre operator (through telnet) or exchange operator, with particular login a/c "cdradmn".

- CDR_MAX_DAYS - Number of days from the current date of IOP, for which CDR files will be available at SEI in normal condition. This also includes the current day at IOP.

A.2 ACRONYMS

BISP		Billing Information Storage Process
CDR	-	Call Detail Record
CEP	-	Command Execution Process
IOP	-	Input Output Processor
ISD	-	International Subscriber's Dialing
INBR	-	IN Call Billing Record
NCBR	-	Normal Call Billing Record
SEI	-	Serial Ethernet Interface Box
STD	-	Subscriber's Trunk Dialling
TGCBR	-	Trunk Group Call Billing Record

A.3   FEATURES INTERFACE

The following are the interfaces of CDR_UTIL with all the features mentioned above:

CDR Based Billing:

To implement CDR based billing, CDR files have to be available in such a system, from which TELNET/FTP is possible. CDR files are generated by BISP at IOP. But IOP doesn't support TCP/IP, so to transfer file from IOP, TELNET/ FTP is not possible. **CDR_UTIL** transfers CDR files from in-service IOP to CES using serial link. From CES Box, CDR files can be collected by the remote CDR collection box; using TELNET/FTP, for billing purpose.

Billing feature in CDOT MAX:

The Billing feature in CDOT MAX provides the CDR files, which are transferred by

CDR_UTIL. If any call is Regional/STD/ISD, or if the subscriber/tgp have detail billing facility, then after the call completion, CDR for the call is stored in the file on IOP.

>IOP Initialization and IOP Fault tolerance (for status change of IOP)

Before any file transfer, level of IOP is checked by CDR_UTIL. CDR file is transferred only from INS_LEVEL IOP. If IOP level is not INS_LEVEL then file is not transferred from that IOP.

>IOP synchronization

The IOP synchronization feature is triggered when IOPs are brought in duplex from simplex. CDR_UTIL has to suspend file transfer activity when synchronization process is going on, until any of the IOP comes to INS_LEVEL.

>Backup Management System in MAX

When CDR_UTIL transfers CDR file from any IOP, copy-out operation shall not be done on that IOP.

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